

# Evaluation Of Current and FY16 HWRF with GFSX

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## Planned/Finished Retrospective HWRF Runs using new GFS

Year	2012	2013	2014	2015	Sum
Storm ID	18L	03L-14L	01L-09L	03L-12L	
Verifiable Samples	30	178	160	210	578

Completed/Total for AL storms: 242/578

Year	2013	2014	2015	Sum
Storm ID	04E-18E	01E-21E	04E-20E	
Verifiable Samples	254	450	238	942

Completed/Total for EP storms: 459/942

# Acronym:

FY15 HWRF: current operational HWRF

FY16 HWRF baseline: Several bug fixes from FY15,  
and smaller time step

H215: FY15 HWRF, current GFS

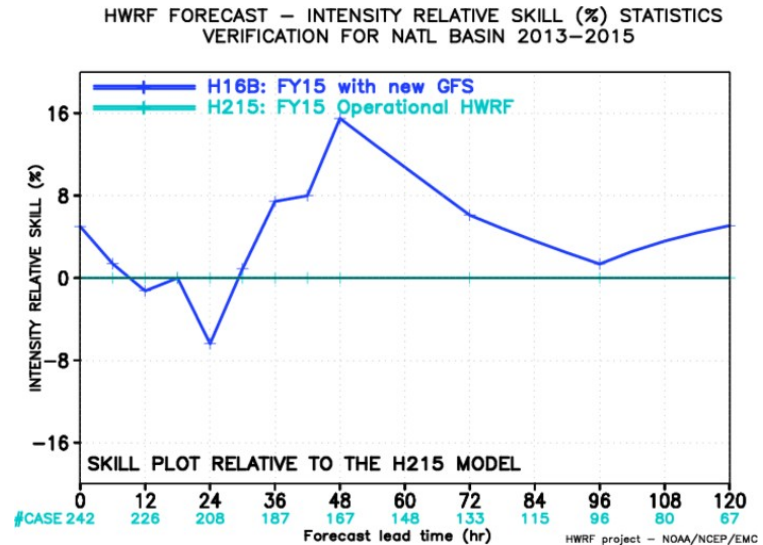
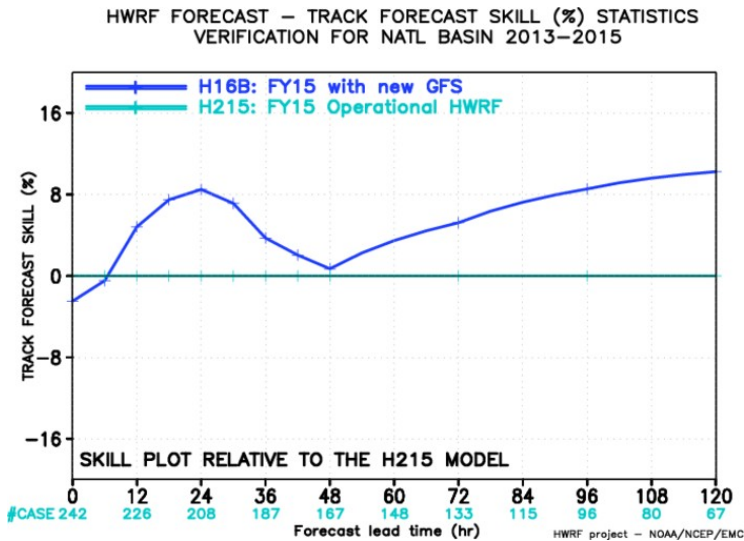
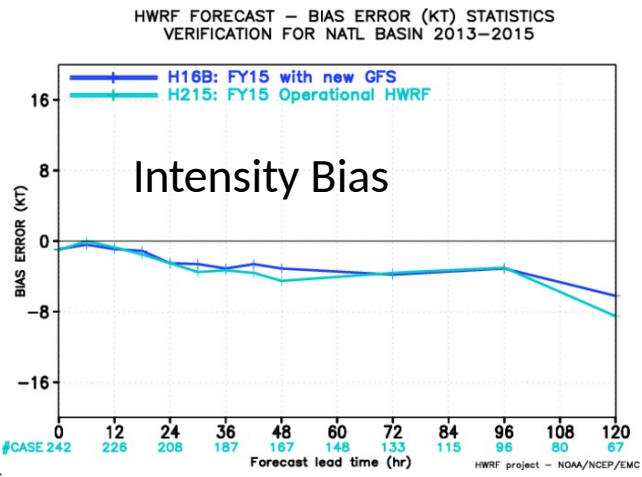
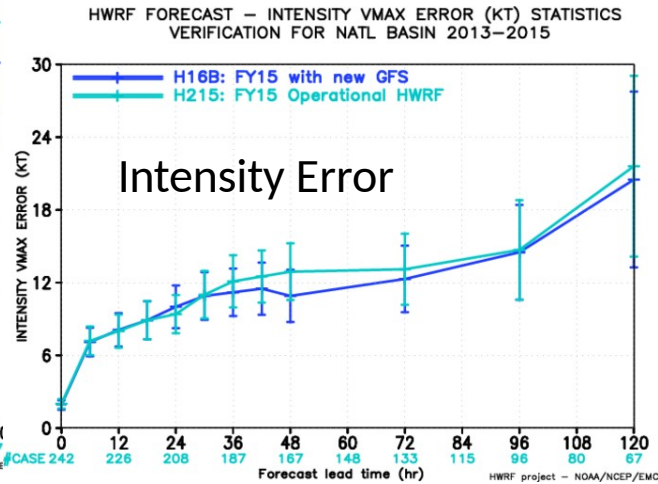
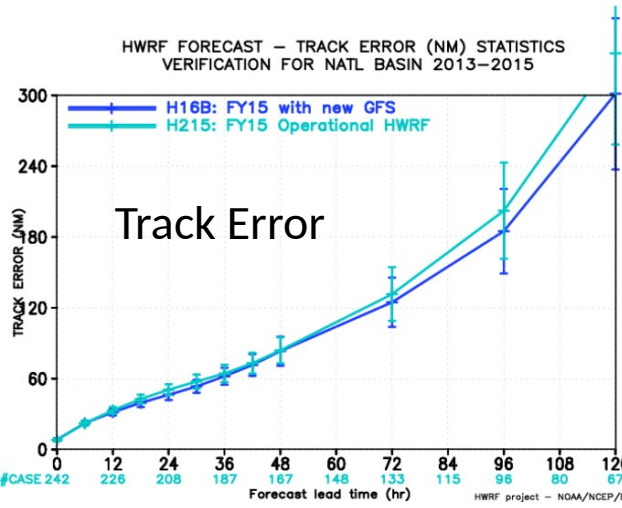
H16B: FY15 HWRF, new GFS

H16A: FY16 HWRF baseline , current GFS

H16C: FY16 HWRF baseline, new GFS

Most of the samples are from 2014 storms  
because new GFS archiving issue

# H16B vs. H215, AL

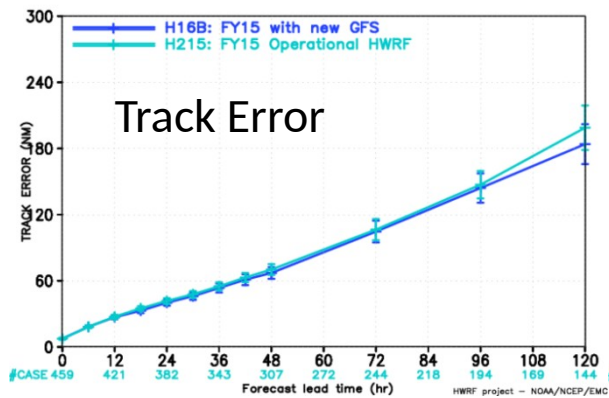


Track Skill improvement

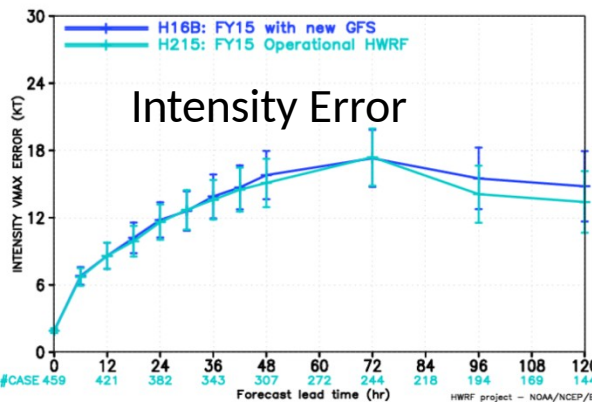
Intensity Skill improvement

# H16B vs. H215, EP

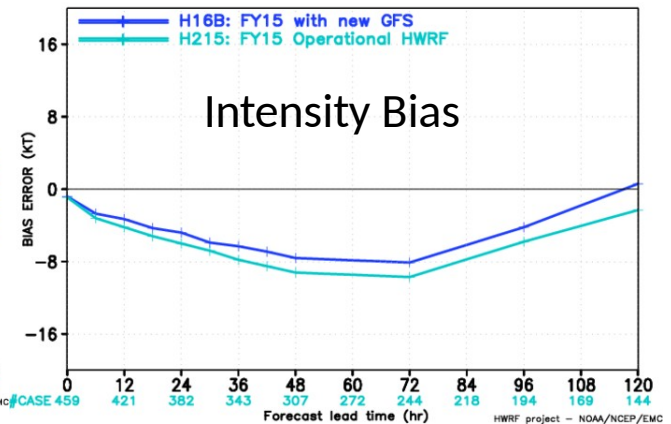
HWRf FORECAST – TRACK ERROR (NM) STATISTICS  
VERIFICATION FOR EPAC BASIN 2013–2015



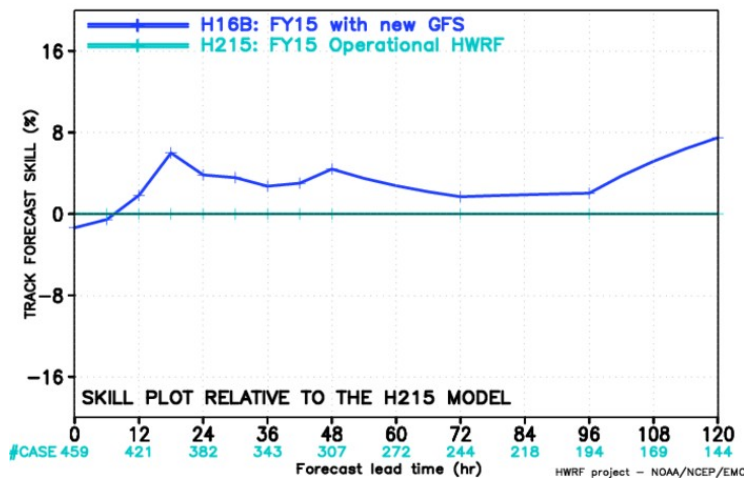
HWRf FORECAST – INTENSITY VMAX ERROR (KT) STATISTICS  
VERIFICATION FOR EPAC BASIN 2013–2015



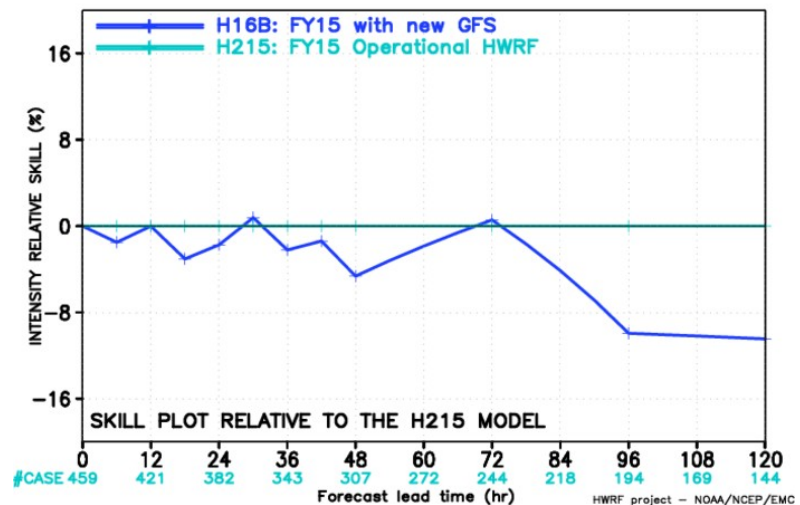
HWRf FORECAST – BIAS ERROR (KT) STATISTICS  
VERIFICATION FOR EPAC BASIN 2013–2015



HWRf FORECAST – TRACK FORECAST SKILL (%) STATISTICS  
VERIFICATION FOR EPAC BASIN 2013–2015



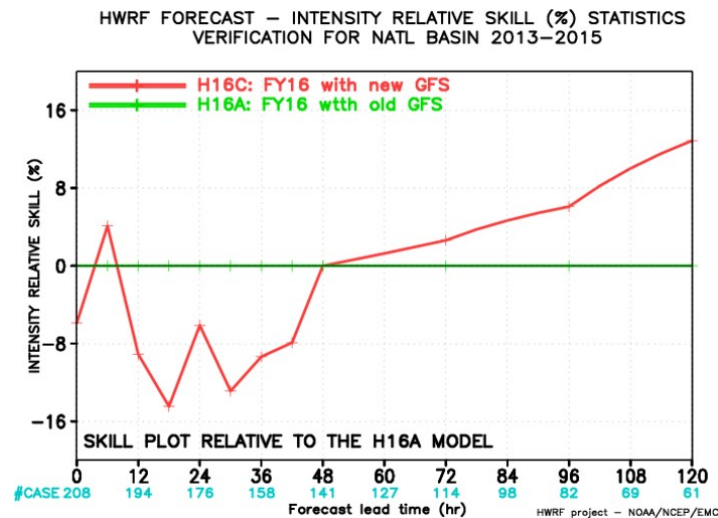
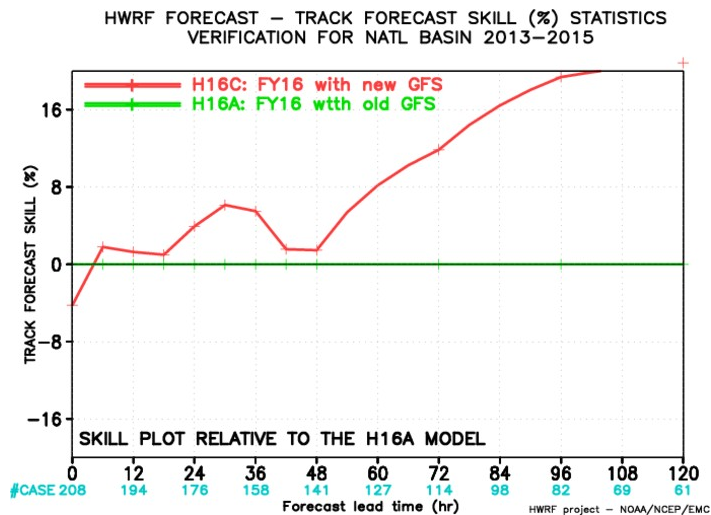
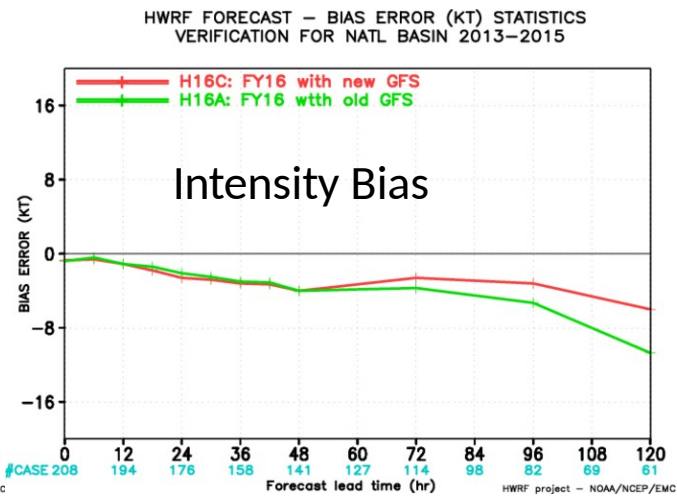
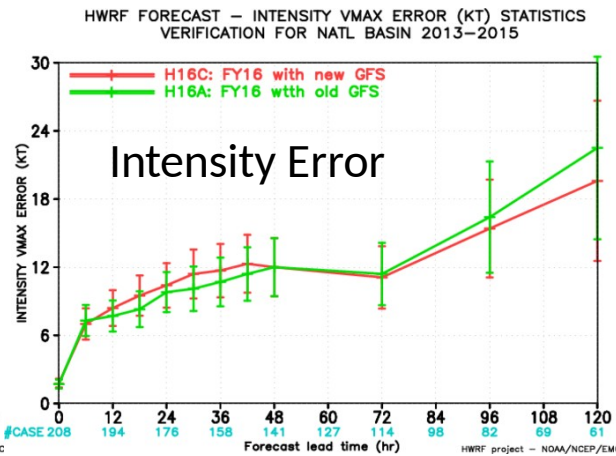
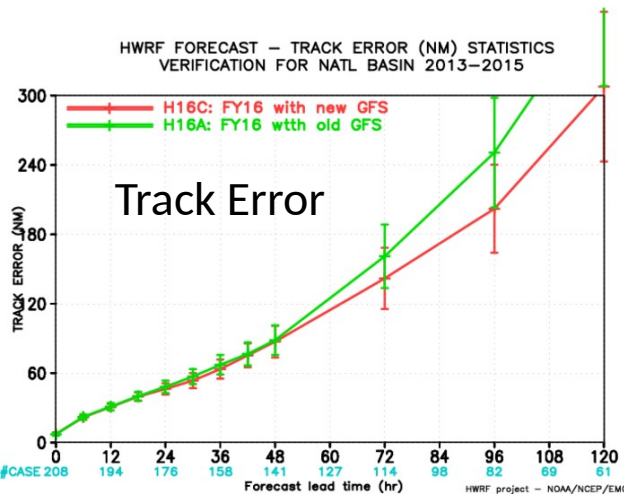
HWRf FORECAST – INTENSITY RELATIVE SKILL (%) STATISTICS  
VERIFICATION FOR EPAC BASIN 2013–2015



Track Skill improvement

Intensity Skill improvement

# H16C vs. H16A, AL

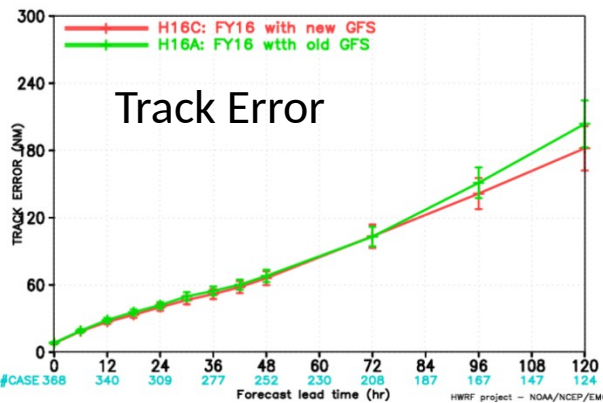


Track Skill improvement

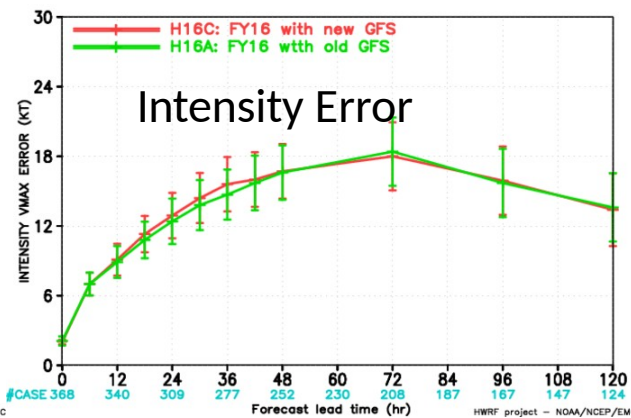
Intensity Skill improvement

# H16C vs. H16A, EP

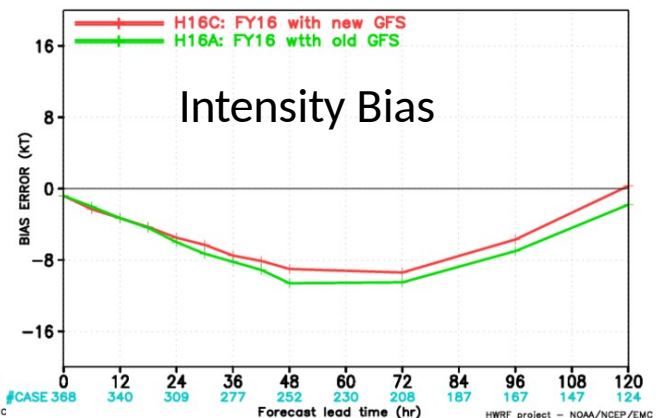
HWRP FORECAST – TRACK ERROR (NM) STATISTICS  
VERIFICATION FOR EPAC BASIN 2013–2015



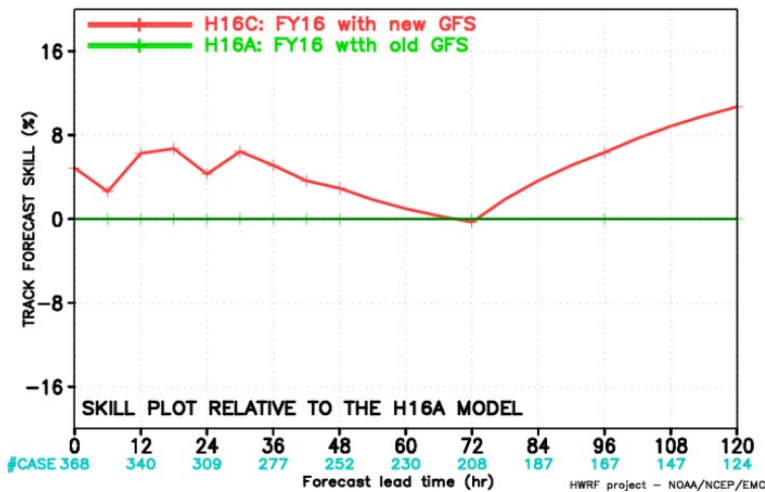
HWRP FORECAST – INTENSITY VMAX ERROR (KT) STATISTICS  
VERIFICATION FOR EPAC BASIN 2013–2015



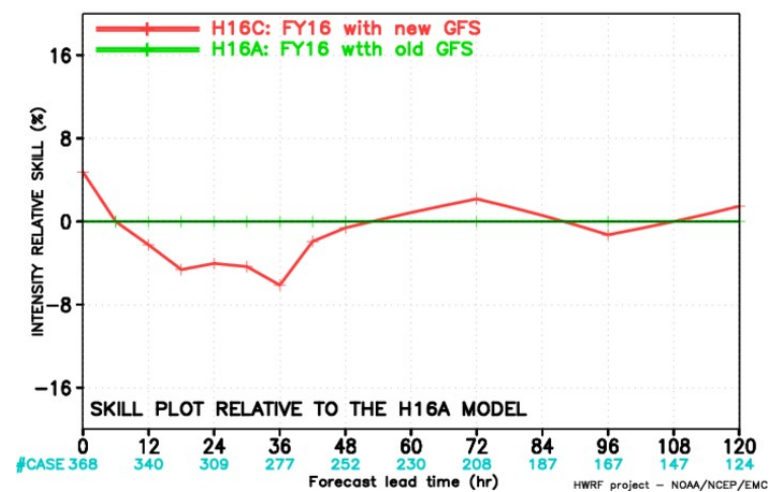
HWRP FORECAST – BIAS ERROR (KT) STATISTICS  
VERIFICATION FOR EPAC BASIN 2013–2015



HWRP FORECAST – TRACK FORECAST SKILL (%) STATISTICS  
VERIFICATION FOR EPAC BASIN 2013–2015



HWRP FORECAST – INTENSITY RELATIVE SKILL (%) STATISTICS  
VERIFICATION FOR EPAC BASIN 2013–2015



Track Skill improvement

Intensity Skill improvement

# HWRF Upgrade Plan for 2016 Implementation

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## Multi-season Pre-Implementation

	Model upgrades	Physics and DA upgrades				Combined
	Baseline (H16C)	Physics Test1 (H16D)	<del>Physics Test2 (H16M)</del>	Coupling test (H16N/H16Ñ)	Data Assimilation*	H216
Descriptions	1. WRF-NMM V3.7.1a dynamic core with 1.a. retention of non-hydrostatic status during the nest movement; 1.b icloud=3 bugfix; 2. New GFS upgrade 3. Smaller time step	New GFS convective SAS, Eddy Diffusivity Mass-Flux Scheme w/ alpha in storm region	Alternative physics-suite	Three-way HWRF-MPIPOM-WaveWatch-III coupled system for AL and HYCOM coupling	Hybrid GSI/HWRF-EPS based DA	Baseline + EDMF+newMP+3-Coupling+DA
Cases	Three-season 2013-2015 simulations in ATL/EPAC, cases (~1500)	Priority cases (TBD)	<del>Priority cases (TBD)</del>	Priority cases (TBD)	Only Aircraft DA cases for 2013-2015	Three-season 2013-2015 retrospectives ~1500 simulations in ATL/EPAC
Platform	WCOSS	WCOSS	<del>Jet</del>	Jet/Zeus	WCOSS/Jet	Jet/WCOSS/Zeus

*The plan is based on the assumption that 2016 operational HWRF system will have 2.5x computer resources as current system on WCOSS within HWRF operational time windows.*

*\* DA experiment requires additional computer resources outside current operational time window.*